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EXAMINER	
BASOM, BLAINE T	

ART UNIT	PAPER NUMBER
2173	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/076,964	CATTELL ET AL.	
	Examiner	Art Unit	
	Blaine Basom	2173	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office action is responsive to the Request for Continued Examination (RCE) filed under 37 CFR §1.53(d) for the instant application on April 4, 2008. The Applicants have properly set forth the RCE, which has been entered into the application, and an examination on the merits follows herewith.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 15, 18, 24-33, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over the "ScanAlyze" program, as is described by the "ScanAlyze User Manual," and also over U. S. Patent No. 5,987,345 to Engelmann et al. (hereinafter "Engelmann"). In general, ScanAlyze is a program for the analysis of DNA microarrays (see page 4).

Specifically regarding claims 15 and 27, ScanAlyze involves displaying an image of a molecular array, whereby the user can "flag" spots according to various parameters, the flagged spots being indicated by a bold outline over their corresponding location on the array image (for example, see pages 19 and 25). Such flagging is used to indicate one or more characteristics ("Ch1D," "Ch2D," "Ch1B," "Ch2B," "Ch1D/B," "Ch2D/B," "Ch1GTB1," "Ch2GTB1," "Ch1KSD," and/or "Ch2KSD") of the array data (for example, see pages 19 and 25). It is apparent that the user can arbitrarily choose one or more of these characteristics to flag spots, resulting in a first set of bold outlines being superimposed over the image, and then choose a different one or more of these characteristics, resulting in a second set of bold outlines being superimposed over the array image. As the first set of bold outlines is displayed separately from the second set of bold outlines, the first set of bold outlines are considered graphically distinct from the second set. The user may thus display an image of a molecular array, and then superimpose a plurality of sets of graphical objects (i.e. bold outlines) on the image of the molecular array, wherein each of the graphical objects of a first set represents a first characteristic (e.g. "Ch1D," "Ch2D," "Ch1B," "Ch2B," "Ch1D/B," "Ch2D/B," "Ch1GTB1," "Ch2GTB1," "Ch1KSD," or "Ch2KSD") of the data and is superimposed on the displayed image of the molecular array over a position where the first data characteristic represented occurs, and each of the graphical objects of a second set represents a second characteristic of the data not represented by the first set of graphical objects, and is superimposed on the displayed image of the molecular array over a position where the second data characteristic represented occurs, wherein the graphical objects of the first set are identical to each other, and wherein the graphical objects of the second set are identical to each other (for example, see pages 19 and 25).

Moreover, the first characteristic can be a characteristic of a feature on the image or a background on the image, and the second data characteristic can likewise be characteristic of a feature on the image or a background on the image; ScanAlyze provides the capability of flagging spots according to a first feature characteristic (e.g. "CH1GTB1") and according to a second feature characteristic (e.g. "CH1KSD"). Accordingly, ScanAlyze is considered to teach a method similar to that of claim 15. By the same reasoning, the graphical user interface of the ScanAlyze program is considered a graphical user interface similar to that recited in claim 27. However, in the ScanAlyze program, the plurality of sets of graphical objects are not simultaneously displayed as is required by claims 15 and 27 – in ScanAlyze the first set is displayed, and then the user can replace the first set with a second set representing a different characteristic. Nevertheless, simultaneously displaying a plurality of sets of graphical objects is well known in the art.

For example, Engelmann demonstrates superimposing and simultaneously displaying a plurality of sets of graphical objects on an image, wherein each of the graphical objects of a first set of the plurality of sets represents a first characteristic of data extracted from the image and is superimposed on the displayed image where the data characteristic represented occurs, and each of the graphical objects of a second set represents a second characteristic of the data not represented by the first set of graphical objects, and is superimposed on the displayed image over a position where the second data characteristic represented occurs, wherein graphical objects of the first set are identical to each other, wherein graphical objects of the second set are identical to each other, and wherein the graphical objects of the first set are graphically distinct from the graphical objects of the second set (see e.g. FIG. 6; and column 6, lines 55-65).

It would have therefore been obvious to one of ordinary skill in the art, having the teachings of ScanAlyze and Engelmann before him at the time the invention was made, to modify the user interface of ScanAlyze such that the plurality of sets of graphical objects can be simultaneously displayed, with objects of the first set being graphically distinct from objects of the second set, as done by Engelmann. It would have been advantageous to one of ordinary skill to utilize this combination, because such functionality allows the user to more efficiently view a plurality of data characteristics extracted from an image, as is demonstrated by Engelmann. Accordingly, ScanAlyze and Engelmann teach – to one of ordinary skill in the art – a method and graphical user interface like that of claims 15 and 27, respectively.

Regarding claims 18, 28-33, and 37, the characteristics in which the distinct graphical objects are superimposed are selected by the user (see page 19 of the ScanAlyze User Manual), and are related to the validity of the background, the validity of the feature, and the location of the feature (see page 25 of the ScanAlyze User Manual). Such graphical objects thus may be used to indicate: a statistically valid feature; a statistically invalid feature; a statistically valid feature background; a statistically invalid feature background; an outlier feature due to non-uniformity of pixel intensities within the feature, due to statistical variance in signal intensity from other features, or due to both non-uniformity of pixel intensities and statistical variance in signal intensities; and outlier feature background due to non-uniformity of pixel intensity with the background, due to statistical variation of the background region from the background regions surrounding other features of the array, or due to both non-uniformity of pixel intensities and statistical various of the background region; or a position of a center of a feature found by analyzing pixel intensities within and near the feature or by row and column indices and a

refined feature grid determined from locations of strong features identified. As it is to the user's discretion regarding the use of these distinct graphical objects, it is understood that they may optionally be superimposed only over statistical outlier features and feature backgrounds.

As per claims 24-26, ScanAlyze teaches reading a sample-exposed array, and visually displaying results using the method described above. It is understood that the user may further process the results, for example, by adjusting parameter values (as done in page 19 of the ScanAlyze User Manual, for example). As such results are maintained on a computer, presumably via a file, it is understood that such results may be forwarded to a remote location, as is well-known in the art.

Claims 16-17 and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the above-described combination of ScanAlyze and Engelmann, over U.S. Patent No. 6,453,251, which is attributed to Bassett, Jr. et al. (hereafter referred to as "Bassett"), and also over U.S. Patent No. 6,437,800, which is attributed to Malamud et al. (and hereafter referred to as "Malamud"). As described above, ScanAlyze and Engelmann teach a method and graphical user interface like that recited in claims 15 and 27, respectively, whereby a molecular array image is displayed concurrently with feature extraction results associated therewith. It is understood that a user may position a pointer over the position of a feature, to flag a feature for example (for example, see page 18 of the ScanAlyze User Manual). Regarding the claimed invention, however, ScanAlyze and Engelmann do not explicitly disclose that alphanumeric information related to a selected feature is displayed in response to selecting the feature, as is expressed in claims 16-17 and 34-35.

Like ScanAlyze, Bassett describes a program for analyzing microarray data (for example, see column 1, line 36 – column 2, line 10). Bassett particularly teaches displaying an image of a microarray, whereby the user may select a spot within the array, resulting in the display of a panel that presents specific information about the selected spot (for example, see figure 6, and its associated description at column 13, line 66 – column 14, line 13).

It would have therefore been obvious to one of ordinary skill in the art, having the teachings of ScanAlyze, Engelmann, and Bassett before him at the time the invention was made, to modify the user interface of ScanAlyze and Engelmann to include functionality of Bassett, so that in response to selecting a spot, alphanumeric data associated with that feature is displayed. It would have been advantageous to one of ordinary skill to utilize this combination because such functionality provides the user with an efficient and easy means for obtaining specified information about any spot, as is demonstrated by Bassett. ScanAlyze, Engelmann, and Bassett thus teach receiving an input indication of a feature, i.e. spot, and displaying an alphanumeric representation of information related to the feature, including results from a feature extraction process. ScanAlyze, Engelmann, and Bassett, however, do not explicitly teach displaying such alphanumeric information within a tooltip, as is claimed. Nevertheless, tooltips are well known in the art. For example, Malamud teaches displaying a tooltip in response to a user positioning a pointer over a graphical object, wherein the tooltip displays alphanumeric information associated with the object (for example, see column 1, lines 34-49; and column 3, lines 26-47). It would have therefore been obvious to one of ordinary skill in the art, having the teachings of ScanAlyze, Engelmann, Basset and Malamud before him at the time the invention was made, to modify the user interface of ScanAlyze to include the tooltips of Malamud, so that in response to

positioning a cursor over a feature, alphanumeric data associated with that feature is displayed in a tooltip. It would have been advantageous to one of ordinary skill to utilize this combination because such tooltips may reduce confusion and the burden of the user when viewing data associated with a feature, as is taught by Malamud (for example, see column 1, lines 15-43).

Claims 19-23 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over the above-described combination of ScanAlyze and Engelmann, and also over the "Dapple" application, as described by the article entitled, "Dapple: Improved Techniques for Finding Spots on DNA Microarrays," which is attributed to Buhler et al. (and hereafter referred to as "Buhler"). As described above, ScanAlyze involves displaying distinct graphical objects superimposed over features of a molecular array. The characteristics in which the distinct graphical objects are superimposed are selected by the user (see page 19 of the ScanAlyze User Manual), and are related to the validity of the background, the validity of the feature, and the location of the feature (see page 25 of the ScanAlyze User Manual). Such graphical objects thus may be used to indicate: a statistically valid feature; a statistically invalid feature; a statistically valid feature background; a statistically invalid feature background; an outlier feature due to non-uniformity of pixel intensities within the feature, due to statistical variance in signal intensity from other features, or due to both non-uniformity of pixel intensities and statistical variance in signal intensities; and outlier feature background due to non-uniformity of pixel intensity with the background, due to statistical variation of the background region from the background regions surrounding other features of the array, or due to both non-uniformity of pixel intensities and statistical variance of the background region; or a position of a center of a feature found by

analyzing pixel intensities within and near the feature or by row and column indices and a refined feature grid determined from locations of strong features identified. ScanAlyze, however, does not involve using distinct types of indications, distinct from the others in terms of shape or color, to indicate such characteristics. Like ScanAlyze, Dapple is an application used for displaying and analyzing molecular arrays (see the "Introduction" on page 1). Dapple particularly teaches marking spots using a plurality of distinct graphical objects, to indicate valid features, invalid features, and "intermediate" quality features (see 3.3 on page 5), and is therefore understood to involve distinct types of indications, distinct from the others in terms of shape or color, to indicate such characteristics. Accordingly it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the ScanAlyze application by using different types of indications to indicate valid features, valid feature backgrounds, invalid features, invalid feature backgrounds, and positions of features, as taught by Dapple. One would have been motivated to create such a combination because such different types of indications aid the user in analyzing a molecular array, as is demonstrated by Dapple. As such indications are arbitrary, these indications may comprise figures like recited in claims 20 and 21, and have colors like expressed in claims 22 and 23.

Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over the above-described combination of ScanAlyze and Engelmann, and also over the "ImaGene" application, as described by the "ImaGene Tutorial."[1] As described above, ScanAlyze and Engelmann teach a method like that of claim 15, which involves displaying distinct graphical objects

[1] The "ImaGene" reference was introduced in the Non-Final Rejection mailed on March, 24, 2005.

superimposed over an image of a molecular array, the graphical objects each representing a characteristic of a feature or of a background on the array. The characteristics represented by the graphical objects are selected by the user (see page 19 of the ScanAlyze User Manual), and can be a characteristic (e.g. "Ch1B") of a background around a feature on the image (see pages 19 and 23 of the ScanAlyze User Manual). ScanAlyze, however, is not explicit as to whether the characteristic of the background is a characteristic of a *local* background, as is required by claim 38.

Nevertheless, ImaGene similarly teaches flagging features (i.e. spots) of a microarray image according to user selected characteristics (see e.g. pages 35-40). Particularly, the user can choose to flag features according to a characteristic of a local background of the features (see e.g. "steps" 4-10 on pages 36-39, with particular respect to steps 5-7).

It would have therefore been obvious to one of ordinary skill in the art, having the teachings of ScanAlyze, Engelmann, and ImaGene before him at the time the invention was made, to modify the user interface of ScanAlyze and Engelmann such that the graphical objects (i.e. the graphical objects of the first or second set) can represent a characteristic of a *local* background around a feature on the image, like done by ImaGene. It would have been advantageous to one of ordinary skill to utilize this combination, because the local background can be applied to determine poor quality features due to background defects appearing in an arbitrary part of the image, as is taught by ImaGene (see e.g. "steps" 4-10 on pages 36-39, with particular respect to steps 5-7). ScanAlyze, Engelmann, and ImaGene are thus considered to teach, to one of ordinary skill in the art, a method like that of claim 38.

Response to Arguments

The Examiner acknowledges the Applicants' amendments to claims 15 and 27, and the Applicants' addition of new claim 38.

Regarding the rejection of claims 15, 18, 24-33, and 37, the Applicants submit that Eisen ("ScanAlyze") does not disclose or suggest superimposing an object within the body of a feature of superimposing an object on a background surrounding a feature. In response, the Examiner respectfully submits that claims 15, 18, 24-33, and 37 do not require superimposing an object within the body of a feature of superimposing an object on a background surrounding a feature.

For instance, claim 1 recites "wherein each of the graphical objects of a first set of said sets represents a first characteristic of the data and is superimposed on the displayed image of the molecular array over a position where the first data characteristic represented occurs, and each of the graphical objects of a second set of said sets represents a second characteristic of the data not represented by the first set of graphical objects, and is superimposed on the displayed image of the molecular array over a position where the second data characteristic represented occurs, wherein the first data characteristic can be a characteristic of a feature on the image or a background on the image and wherein the second data characteristic can be a characteristic of a feature on the image or a background on the image." The broadest, most reasonable interpretation of the phrase "wherein each of the graphical objects…is superimposed on the displayed image of the molecular array over a position where the [first/second] data characteristic represented occurs…wherein the [first/second] data characteristic can be a characteristic of a feature…" does not necessarily entail superimposing an object *within the body*

of a feature. Rather, superimposing a bold outline on a feature – as taught by Eisen – can be considered to read on the phase, since the graphical object (i.e. the bold outline) is superimposed on the displayed image of the molecular array over a position (i.e. over a feature) where the data characteristic represented by the outline occurs.

Moreover the phase, "wherein the first data characteristic can be a characteristic of a feature on the image or a background on the image and wherein the second data characteristic can be a characteristic of a feature on the image or a background on the image," does not necessarily require any characteristic to be a characteristic of a background. Due to the "or" terminology, the first data characteristic can be a characteristic of a feature and the second data characteristic can be a characteristic of a feature, and fully comply with the phase. Since the first or second data characteristic need not be a characteristic of a background, the graphical objects superimposed on the displayed image of the molecular array over a position where the first or second data characteristic represented occurs need not be superimposed over the background. Accordingly, even though Eisen does not disclose or suggest superimposing an object within the body of a feature of superimposing an object on a background surrounding a feature, Eisen can still be considered to teach the phrase, "wherein each of the graphical objects of a first set of said sets represents a first characteristic of the data and is superimposed on the displayed image of the molecular array over a position where the first data characteristic represented occurs, and each of the graphical objects of a second set of said sets represents a second characteristic of the data not represented by the first set of graphical objects, and is superimposed on the displayed image of the molecular array over a position where the second data characteristic represented occurs, wherein the first data characteristic can be a characteristic of a feature on the image or a

background on the image and wherein the second data characteristic can be a characteristic of a feature on the image or a background on the image," as is described above (see e.g. the rejection for claim 1).

Further regarding the rejection of claims 15, 18, 24-33, and 37, the Applicants argue that it would not have been obvious, in view of Engelmann (U.S. Patent No. 5,987,345), to modify the ScanAlyze user interface so that a plurality of sets of graphical objects can be simultaneously displayed, because ScanAlyze makes no provision for individually identifying different characteristics of the data on the display. The Examiner, however, respectfully disagrees. ScanAlyze provides an interface for individually identifying different characteristics (e.g. "Ch1D," "Ch2D," "Ch1B," "Ch2B," "Ch1D/B," "Ch2D/B," "Ch1GTB1," "Ch2GTB1," "Ch1KSD," and/or "Ch2KSD") of the data on the display. Accordingly, the Examiner respectfully maintains that it would not have been obvious, in view of Engelmann (U.S. Patent No. 5,987,345), to modify the ScanAlyze user interface so that a plurality of sets of graphical objects can be simultaneously displayed.

Further regarding the rejection of claims 15, 18, 24-33, and 37, the Applicants argue that Engelmann is not analogous art because it does not pertain to feature extraction of microarrays or manipulating and displaying data results therefrom. The Examiner respectfully disagrees. Whereas Engelmann does not specifically pertain to feature extraction of microarrays or manipulating and displaying data results therefrom, Engelmann is still analogous, because it relates in general to feature extraction from images, and manipulating and displaying data results therefrom, which is a substantial feature of both ScanAlyze and the claimed invention (see e.g. FIG. 6; and column 6, lines 55-65).

With respect to claims 16-17, 19-23, and 34-36, the Applicants refer to their arguments regarding claims 15, 18, 24-33, and 37, upon which claims 16-17 and 34-45 depend. Since, as described above, the Examiner respectfully disagrees with these arguments, the Examiner respectfully maintains the rejections for claims -17, 19-23, and 34-36.

The Applicant's arguments filed April 4, 2008 have thus been fully considered, but are not persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Blaine Basom whose telephone number is (571)272-4044. The examiner can normally be reached on Monday through Friday, from 8:30 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dennis Chow can be reached on (571)272-7767. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tadesse Hailu/
Primary Examiner, Art Unit 2173

/BTB/
8/1/2008